What Is the Value Given by Consumers to Nutritional Label Information? Results from a Large Investigation in Europe

Gregori, Dario; Ballali, Simonetta; Vögele, Claus; Galasso, Francesca; Widhalm, Kurt; Berchialla, Paola; Baldi, Ileana. What Is the Value Given by Consumers to Nutritional Label Information? Results from a Large Investigation in Europe. JOURNAL OF THE AMERICAN COLLEGE OF NUTRITION. 34 (2) pp: 120-125.
DOI: 10.1080/07315724.2014.899936

Title: What Is the Value Given by Consumers to Nutritional Label Information? Results from a Large Investigation in Europe

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Rationale: Nutrition labels on prepackaged foods have been widely advocated as a medium to foster healthier eating habits in the general population.

Objective: The study is aimed at understanding how people value nutritional information on food labels, in particular for front-of-pack labeling.

Methods: A phone-assisted survey of 7550 consumers in 16 European countries was conducted. People were asked about their opinion on nutritional information provided at different levels, from the media to public institutions, and their commitment to healthy behavior. The value of pack labeling was estimated using a willingness-to-pay (WTP) elicitation technique.

Results: Older age groups (>45 years old), members of a larger family, people of low income or low education, and those who perceived themselves to be obese valued front-of-pack nutritional labeling. WTP estimates across all countries provided an average accepted added price of $4.32 to the overall yearly food expenditure (95% confidence interval, 3.33–3.68).

Conclusions: Overall, perceived value of labeling is low. However, factors affecting the value for consumer of nutritional labeling appear to be strictly linked to the socioeconomic and health status of the respondents.

Key words: nutritional labels, front-of-pack, willingness to pay, consumers' utility

Introduction

Nutrition labels on prepackaged foods have been widely advocated as a medium to foster healthier eating habits in the general population [1] and healthier product development [2], with the hope that it will contribute to a reduction in the incidence and prevalence of diet-related conditions. The solution represented by nutritional labeling proposes to attract consumers to the food manufacturer; this linkage allows the communication of essential information about the nutritional value and composition of their product. In this hypothetical scenario, the compliance of consumers to nutritional facts results in healthier choices, meaning that consumers are enabled to appraise the nutrient contribution of specific foods to the overall diet, leading to the consumption of altered amounts of food or products with lower nutrition-related disease risk factors [3].

An important facet that needs to be highlighted is the multiplicity intrinsic with the present labeling system. The first division that has to be made refers to the position of the label within the package, distinguishing between front-of-pack (FOP), back-of-back (BOP), and side-of-pack labels. FOP labels usually give a quick guide to calories, sugar content, fat content, saturated fat content, and salt content. There is a wide choice of FOP nutrition labels, like multiple traffic light labels, nutrition tables, labels based on guideline daily amounts, and signpost logos (e.g., Health Tick, Choices Logo). Essentially these labels differ in the nutritional detail that they communicate, providing information on the number of grams of fat, saturated fat, sugar, and salt and the number of calories in a serving or portion of the food. Nutrition labels on the side or back are often displayed as a panel or grid. This type of label usually includes information on energy (calories), protein, carbohydrates, and fat and might provide additional information on saturated fat, sugars, sodium, salt, and fiber. All nutrition information is provided per 100 grams or per 100 cal and sometimes per portion of the food. Food labeling has been implemented in several countries in the European Union (EU), and results regarding the penetration of labeling in 28 countries (27 European countries plus Turkey) have been published by a recent European Union–funded project, Food Labeling to Advance Better Education for Life [4]. On average, 85% of the products contained BOP nutrition labeling or related information (from 70% in Slovenia to 97% in Ireland), versus 48% for FOP information (from 24% in Turkey to 82%in the UK).

The variety of choices regarding label format matched with consumers' habits in food selection has resulted in no convincing evidence that food labels are an effective means to achieve the desired effect at the population level; that is, a reduction or at least truncation of current prevalence rates in diet-related disorders, although there is general agreement on the potential benefits of food labels in helping consumers to make informed dietary choices adapted to their individual needs [1, 3, 5].

Several factors have been suggested to account for this decoupling of efficacy—that is, difficulties in understanding the information on food labels—with the limited capacity of information to be readily translated into purchase behavior [1].

Nevertheless, nutritional labels' inclusion on food items is an important resolution that concerns policy makers and food manufacturers. When considering the decision-making process, a decision-making assessment is the perceived usefulness of the nutritional label, compared to the economic burden implied by the new labeling procedure. Willingness to pay (WTP) is the economic notion used to quantify this usefulness in monetary terms [6], commonly with ad hoc surveys, where hypothetical conditions or prices are evaluated [7].

The present article illustrates the results of a survey on consumers' understanding and WTP for food labels in the EU. To present a comprehensive overview of Europeans' understanding of nutritional labels and their opinion on the communication policies adopted for their diffusion, a large phone survey was conducted in

16 European countries: Austria, Belgium, Denmark, France, Germany, Greece, Italy, The Netherlands, Poland, Portugal, Czech Republic, Slovenia, Spain, Sweden, the United Kingdom, and Hungary.

Consumers were asked about their opinion on nutritional information provided at different levels, from the media to public bodies, and their commitment to healthy behavior. The value of pack labeling was estimated using a WTP elicitation technique.

MATERIAL AND METHODS

Survey Methodology

A computer-assisted telephone interview was conducted at ZETA Research Ltd.'s facility (www.zetaresearch.eu) from January to April 2011, using a population-based sample of the aforementioned 16 European countries. Ten experienced computer-assisted telephone interview operators conducted the interviews in the language native to the respective country. Respondents were informed verbally of the focus of the study and following use for scientific purposes and publications. Verbal consent was obtained from all participants. No institutional review board approval was required for the present survey [8].

Survey Design

The survey's questionnaire was developed by the authors of the current article, supported by information obtained from European surveys on food labels and their penetration and impact [5,9]. Data were collected on basic demographic characteristics; obesity-related perceptions; family composition, size, and presence of children; education; and yearly income.

Within the broader selection of sold products, the main focus was oriented toward food products, considered as a whole, without specific questions on selected groups.

WTP Section

As a preliminary step, attitudes toward the valuation of food products were broadly investigated, using semistructured interviews, on a small sample of 60 individuals. In this pretest session, the WTP question was presented as an open-ended question to help us determine the proper design to select for the final survey. These persons did not take part in the subsequent phases of the study.

Then, the WTP section of the survey was developed on the basis of the results of the preliminary interviews. The concept of WTP was defined as "the value given by the introduction of front-of-pack labels on packaged foods as an additional price over their annual expenditure for food items." Such wording of the concept of the economic value of nutrition labeling resulted as the most understood in the preliminary interviews and became the target of the WTP exercise.

Questions about WTP were based on a dichotomous choice model [10], where people were asked to state whether they were willing to pay a given (X) amount of money to procure a good. In this model, the X amount of Euros ranged from $0 to $79.85 per year (0.5, 1, 2, 4, 8, 16, 32, 64), randomly assigned as a starting point and then progressing or diminishing as the subjects accepted or refused to pay the stated amount. A double-bound limit was established at $0.62 or $159.70 per year.

The chosen final monetary amounts were rescaled using a country-specific coefficient to account for differences in cost of living in the respective countries. The gross domestic product per capita in Purchasing

Power Standards was derived from EUROSTAT data [11]. Fixing the European average equal to 100, rescaling factors were as follows:

Belgium 116, Czech Republic 82, Denmark 121, Germany 116, Greece 93, Spain 103, France 108, Italy 104, Hungary 65, The Netherlands 131, Austria 124, Poland 61, Portugal 80, Slovenia 88, Sweden 118, and the United Kingdom

Sampling Plan

A stratified sampling plan was adopted. The planned sample sizes were computed to ensure precision of the estimates at the European global level. Population size adopted in the sampling plan was taken from EUROSTAT [11].

The survey required a total of 7550 interviews, performed over a 2-month period. Participants were selected using random digit dialing, stratified with varying size across countries: Germany, France, the United Kingdom, and Italy were represented with a total of 800 interviews in each country, and 500 were conducted in Greece, Portugal, and Spain; 400 interviews were performed in Austria, Belgium, Czech Republic, Hungary, and Poland and 250 were conducted in Belgium, Denmark, The Netherlands, Slovenia, and Sweden. Poststratification weights were applied for analysis.

Statistical Analysis

Survey responses were described using 95% confidence intervals using the Survey library of R [12]. The double bounded WTP model was estimated using the R system [13].

Model selection was done using Akaike's information criterion [14]. Survey responses to the WTP were used to estimate the mean WTP with a double-bounded model, following previous recommendations [10].

Estimation of the parameters was conducted via maximum likelihood. The respective WTP estimates were calculated using the following validated formula [15]:

$$E(WTP) = -\frac{1}{\rho}(1 + e^{\gamma_0})$$

Notice that γ_0 represents the so-called grand constant, which is the sum of the products of the estimated coefficients times the mean values of the corresponding variables (excluding the monetary coefficient) [16], and r0 is the coefficient associated with the monetary amount. Results from the double bounded probit were used to generate the confidence intervals by the bootstrapping technique [17].

RESULTS

A total of 7550 completed interviews were analyzed out of 10,300 contacted persons (26% refusal rate). The majority of respondents were women (71.2%) and the most frequent age group was 55 to 64 years old (20.2%). Among all interviewees, 95.6% agreed to give their opinion on nutritional policies and personal perceptions of food-related issues. The majority of the interviewees (74.4%) reported no obesity problem; having at least one child with overweight or obesity problems was reported in 10.7% of cases. Detailed sociodemographic data are provided in Table 1.

Willingness to Pay

WTP estimates are given in Table 2. Customers' willingness to spend more money on specifically labeled food did not appear homogeneously distributed among sociodemographic groups. Older age groups (>45 years old) responded positively to an increase in prices with nutritional labeling. Similar effects were observed if respondents were members of a larger family (>7 members), perceived themselves as obese, or had a low income or low education level, whereas high income showed an inverse association with WTP. WTP estimates across all countries provided an average accepted added price of $4.32 to the overall yearly food expenditure (95% confidence interval, 4.15–4.59). Table 3 summarizes the estimated WTP for each participant country, with a maximum level observed for Sweden ($6.65) and the lowest for Spain ($2.33).

DISCUSSION

As emphasized by Loureiro et al. [10], a broad survey on WTP should allow for conclusions to be drawn about the preferences of consumers in a wider context, because most new legislation affects the entire EU. This pan-European survey provides, for the first time and in a unified framework, the estimates on Europeans' WTP for price increases associated with the potential introduction of mandatory labels, assessing as a secondary objective consumers' understanding of nutritional labels and their opinion on communication policies adopted for their diffusion.

WTP has been proposed as a reliable way [18] to understand how people value products or services. In our study, it has been shown to be a valid instrument to obtain information on the perceived utility of nutritional label for consumers [19], in particular with reference to the European context [20]. Several studies have highlighted the role of labeling in the decision-making process [21]. The family context was also considered, because the perceived effects on the health of other family members represent a potent imperative [22]. Interviewees were, therefore, asked about obesity and overweight issues related to their family, in order to switch the focus from the personal purchase perspective to a broader one. Behavioral aspects and decision-making processes by consumers are clearly influenced by ethnic and related cultural aspects [23].

However, the role that ethnicity plays as an independent factor is still controversial [24]. In our analysis, attitudes toward the role of food labeling have not been estimated because of the small numbers in some ethnic categories.

Food labeling is a dynamic field with a distinctive purpose: it is intended to highlight essential information on the nutritional value and composition of food products. In 2004, the World Health Organization included nutrition labeling as part of its global strategy on diet, physical activity, and health [25]. Currently, such information is not compulsory in the EU, unless a nutrition or health claim is made [26, 27]. The variety of formats for FOP labels that can be found is broad: multiple traffic light labels, nutrition tables, labels based on guideline daily amounts, and signpost logos (e.g., Health Tick, Choices Logo). Consumers are provided with different types of information, ranging from data on the number of grams of fat, saturated fat, sugars, and salt to a more specific focus on calories. Being presented with a whole set of information, consumers' choice is therefore the main factor that has to be considered by policy makers and manufacturers [28]. In 2004, the European Advisory Services carried out a study for DG SANCO of the European Commission in order to evaluate the potential impact of the introduction of mandatory nutrition labeling for prepackaged food products across the EU [29], revealing that the costs for the 203 surveyed companies would be in excess of about $700 million (58.6% of surveyed companies had a turnover in excess of about $62 million, 31.5% between $2.50 and $62 million, and 9.9% below $2.5 million). A 2009 experimental study evaluated the WTP of consumers for foodaway-from-home products, in order to link the potential increases indicated in the EU report to the purchases of food with or without nutritional information [30]. Results generally showed that consumers' WTP was higher for products with nutritional information than for products without, suggesting that consumers' evaluation of products with nutritional information could vary,

depending on the type or amount of information on the label. These findings emphasize how, in consumers' decision making, the immediacy of understanding plays an important role; consumers unanimously prefer the reduced cognitive effort associated with the "per portion" sizing method, when compared to the other 2 choices. In addition, in the present study, the average bid per year is $4.35, which, further to the results of Campos et al. [1], shows that the nutritional premium associated with the labeling is not yet translated into an economic value.

According to Loureiro et al. [10], who studied WTP for a specific product, factors affecting consumer preferences for nutritional labeling appear to be strictly linked to the health status of the respondents: particularly, in the present study, those who perceive themselves as obese seem to be more willing to pay for nutritional information. Moreover, our study found a stronger WTP in low-income families. Our results clearly show how low-income families, which were less aware of the correct meaning of the nutritional information, would pay more than high-income families to have readily accessible FOP information.

These results concur with previous studies on low-income populations, showing that these consumers have difficulty in understanding the terms used on food labels [31] and would appreciate and be even willing to pay for more easily understandable information. Consumers from these income strata should be targeted for community-based nutrition education interventions to motivate them to use nutrition labels [32]. In comparison with previous studies, WTP was lower: this discrepancy can be explained by the high prevalence of low-income and low-education groups in the current study, who are willing to pay more, in relation to their income, but have better awareness regarding product choice and purchase.

FUNDING

This research was partially funded by an unrestricted grant of the University of Padova and of Prochild ONLUS. The research also benefited from the technical assistance of ZETA Research Ltd., who conducted the survey.

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Table 1. Sociodemographic Characteristics of the Survey Respondents

	N	%
Gender		
Male	2179	28.9
Female	5371	71.2
Ethnicity		
African	2	0.1
American	66	0.9
Arabic	34	0.5
Asian	24	0.3
Caucasic	7367	97.6
Hispanic	33	0.4
Other	24	0.3
Age group		
18–24	407	5.4
25–34	736	9.7
35–44	1016	13.5
45–54	1256	16.6
55–64	1523	20.2
65–74	1364	18.1
75–84	895	11.9
85 or older	190	2.5
No answer	163	2.2
Children's age (years)		
0–3	389	7.6
4–11	884	18.1
12–15	579	11.8
16–25	1604	32.8
36–45	2078	42.5
46–55	1079	22
56 or older	280	5.7
Family size		
1	1450	19.2
2	2536	33.6
3	1344	17.8
4	1234	16.3
5	410	5.4
6	103	1.4
7 or more	68	0.9
No answer	405	5.4
Family yearly income (€)		
0–15,000	1462	19.4
15,000–35,000	746	9.9
35,000–45,000	206	2.7
Over 45,000	89	1.2
No answer	5047	66.8
Educational level		
Elementary school	1084	14.4
Junior high school	1715	22.7
Senior high school	2351	31.1
3-Year degree	1057	14
5-Year degree	590	7.8
Other postgrad diploma	152	2
No answer	601	8

Table 2. Estimates ($) of the WTP, both Overall and by Country

	ρ	95% Confidence Interval	
Overall	4.35	4.16	4.59
Country			
Sweden	6.65	5.7	9.52
Poland	5.95	4.22	11.97
France	4.78	4.04	5.63
United Kingdom	4.63	3.83	5.66
Germany	4.5	3.89	5.68
Slovenia	4.37	3.59	6.15
Austria	4.3	3.32	6.00
Greece	4.21	3.78	5.18
Italy	4.14	3.53	5.08
Czech Republic	3.63	3.03	4.09
Belgium	3.97	3.01	4.67
Denmark	3.34	2.68	4.74
Portugal	3.26	2.8	4.37
The Netherlands	3.18	2.7	4.63
Hungary	2.46	2.13	2.92
Spain	2.33	2.06	2.80

Table 3. Variables Associated with WTP in the Probit Model Used for the Analysis

Variables	Estimate	Standard Error	*p*-Value
Intercept	0.794	0.135	<0.001
ρ	−0.250	0.010	<0.001
Gender (reference female)	−0.001	0.038	0.977
Age (reference 18–25)			
25–34	−0.003	0.08	0.968
35–44	0.053	0.079	0.507
45–54	0.149	0.076	0.050
55–64	0.160	0.078	0.042
65–74	0.158	0.081	0.051
75–84	0.145	0.087	0.094
85 or older	0.231	0.134	0.083
Family with a child younger than 15 years	0.026	0.066	0.699
Family size (reference: 1)			
2	−0.019	0.047	0.681
3	0.072	0.060	0.229
4	−0.010	0.062	0.866
5	0.033	0.083	0.688
6	−0.248	0.140	0.077
7 or more	0.413	0.204	0.043
Total income ($) (reference: <18,720)			
18,720–43,675	0.171	0.068	0.012
43,675–56,150	−0.000	0.107	0.998
Over 56,150	−0.101	0.044	0.021
Degree (reference <2 years)			
2- to 5-year degree	0.173	0.064	0.007
Elementary school	0.105	0.053	0.050
Junior high school	−0.003	0.043	0.939
Senior high school	0.051	0.116	0.660
Bachelor's degree or higher	0.239	0.07	<0.001
Perceives her/himself as obese	0.129	0.040	0.001
Perceives her/his partner as obese	0.083	0.050	0.097
Perceives her/his child as obese	0.007	0.047	0.877